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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/789,423 | 02/27/2004 | Harald Bottner | M0659.0002 | 5684 |

38881 7590 03/26/2007

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| EXAMINER | |
|---|---|
| SANDVIK, BENJAMIN P | |
| ART UNIT | PAPER NUMBER |
| 2826 | |

| SHORTENED STATUTORY PERIOD OF RESPONSE | NOTIFICATION DATE | DELIVERY MODE |
|---|---|---|
| 3 MONTHS | 03/26/2007 | ELECTRONIC |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 03/26/2007.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/789,423 | BOTTNER ET AL. | |
| | Examiner | Art Unit | |
| | Ben P. Sandvik | 2826 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *11 December 2006*.

2a)☐ This action is **FINAL**.. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) *1,3 and 7-21* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2,4-6 and 22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Continued Examination Under 37 CFR 1.114*

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/11/2006 has been entered.

### *Response to Arguments*

Applicant's arguments with respect to claim 2 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's arguments with respect to claim 5 have been fully considered but they are not persuasive. The amendment is directed to a "product by process" limitation as described in the rejection below.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tauchi (U.S. Patent #5966939), in view of Hayes et al (U.S. Patent #6077380), further in view of Ouellet et al (U.S. PG Pub #2004/0067604).

With respect to **claim 2**, Tauchi teaches a microelectromechanical component having at least one soldering layer for joining at least one further component, but does not teach a soldering layer comprising a eutectic mixture of gold and bismuth and a bismuth layer for producing a soldered joint with to a gold layer. Hayes teaches a component having at least one soldering layer for joining to at least one further component (Fig. 9a, the layer formed by balls 108), which component includes at least one soldering layer made from a solder comprising a eutectic mixture of gold and bismuth (Col 6 Ln 64 to Col 7 Ln 6). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a solder as taught by Hayes in the structure of Tauchi in order to optimize the fabrication process of the device. Ouellet teaches a soldering joint comprising a gold alloy and bismuth layer (Abstract and Paragraph 149). It would have obvious to one of ordinary skill in the art at the time the invention was made to provide a bismuth layer on the soldered joint of Tauchi and Hayes as taught by Ouellet in order to reduce the melting point temperature of the composition (as detailed in Fig. 34 of Ouellet).

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tauchi, Hayes, and Ouellet, in view of Kuramoto (U.S. PG Pub #2001/0020744).

With respect to **claim 4**, Tauchi does not teach that at least one soldering layer, prior to the soldering operation, has a layer thickness of 100 nm to 10 micrometers. Kuramoto teaches a solder layer prior to soldering that has a thickness range of between 7 and 40 micrometers (Fig. 3, 14 and as set forth in claim 4). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the solder layer of Hayes to be 100 nm to 10 micrometers based on the teachings of Kuramoto in order to provide enough solder to make a reliable connection.

Claim 5, 6, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tauchi (U.S. Patent #5966939), in view of Hayes et al (U.S. Patent #6077380).

With respect to **claim 5**, Tauchi teaches a soldered joint (Fig. 1, 22) that joins at least two components, at least one component comprising at least two substrates (Fig. 1, 11 and 12) joined together by said solder, and each substrate has a thermo electric material (Fig. 1, 25 and 26) arranged thereon; but does not teach a solder comprising a eutectic mixture of gold and bismuth. Hayes teaches a component having at least one soldering layer for joining to at least one further component (Fig. 9a, the layer formed by balls 108), which component includes at least one soldering layer made from a solder comprising a eutectic mixture of gold and bismuth (Col 6 Ln 64 to Col 7 Ln 6). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a solder as

taught by Hayes in the structure of Tauchi in order to optimize the fabrication process of the device.

Furthermore, with respect to the limitation of claim 5 "wherein the thermoelectric material of each of the at least two substrates is alternatingly spaced between the thermoelectric material of the other of the at least two substrates"; this amended limitation is directed to a process of fabricating two substrates each having thermoelectric material arranged thereon and subsequently joining the substrates as in Figs. 6A and 6B of the instant applicant. Note that a "product by process" claim is directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Wertheim, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); In re Fitzgerald, 205 USPQ 594, 596 (CCPA); In re Marosi et al., 218 USPQ 289 (CAFC); and most recently, In re Thorpe et al., 227 USPQ 964 (CAFC, 1985) all of which make it clear that it is the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that, as here, an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that Applicant has burden of proof in such cases as the above case law makes clear. As to the grounds of rejection under section 103, see MPEP § 2113

With respect to **claim 6**, Tauchi teaches that the thermoelectric material is arranged in the form of a Peltier cooler.

With respect to **claim 22**, Tauchi teaches that the at least one component has a thermal functionality (Col 3 Ln 43-46).

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ben P. Sandvik whose telephone number is (571) 272-8446. The examiner can normally be reached on Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sue Purvis can be reached on 571-272-1236. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

bps

EVAN PERT
PRIMARY EXAMINER